

Translation

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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference EL03019PCT	FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No. PCT/JP2003/011971	International filing date (day/month/year) 19 September 2003 (19.09.2003)	Priority date (day/month/year) 19 September 2002 (19.09.2002)	
International Patent Classification (IPC) or national classification and IPC H01L 21/318, 21/31, 29/78			
Applicant TOKYO ELECTRON LIMITED			

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

a. ☐ (sent to the applicant and to the International Bureau) a total of _____ sheets, as follows:

☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

<input checked="" type="checkbox"/> Box No. I	Basis of the report
<input type="checkbox"/> Box No. II	Priority
<input type="checkbox"/> Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input type="checkbox"/> Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/> Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input type="checkbox"/> Box No. VI	Certain documents cited
<input type="checkbox"/> Box No. VII	Certain defects in the international application
<input type="checkbox"/> Box No. VIII	Certain observations on the international application

Date of submission of the demand 04 February 2004 (04.02.2004)	Date of completion of this report 04 August 2004 (04.08.2004)
Name and mailing address of the IPEA/JP	Authorized officer
Facsimile No.	Telephone No.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/JP2003/011971

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

- ☐ This report is based on translations from the original language into the following language _____, which is language of a translation furnished for the purpose of:
- ☐ international search (under Rules 12.3 and 23.1(b))
- ☐ publication of the international application (under Rule 12.4)
- ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

- ☒ The international application as originally filed/furnished
- ☐ the description:
- pages _____, as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☐ the claims:
- pages _____, as originally filed/furnished
- pages* _____, as amended (together with any statement) under Article 19
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☐ the drawings:
- pages _____, as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to sequence listing (*specify*): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/JP 03/11971

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	4-7, 11-15, 20	YES
	Claims	1-3, 8-10, 16-19	NO
Inventive step (IS)	Claims	4-7, 11-14, 20	YES
	Claims	1-3, 8-10, 15-19	NO
Industrial applicability (IA)	Claims	1-20	YES
	Claims		NO

2. Citations and explanations

Document 1: JP 2001-85427 A (NEC Corp.), 30 March 2001
 Document 2: JP 2002-134503 A (Applied Materials, Inc.),
 10 May 2002
 Document 3: JP 2001-44419 A (Texas Instruments Inc.), 16
 February 2001

Claims 1 to 3, 8 to 10, 16 and 17

The inventions described in claims 1 to 3, 8 to 10, and 16 and 17 lack novelty in the light of document 1 cited in the international search report. The "forming of nitrogen radicals and oxygen radicals using a high-frequency plasma" described in claim 1 is disclosed in document 1 (paragraph [0058]).

Claims 1, 8, 16, 18 and 19

The inventions described in claims 1, 8, 16, and 18 and 19 lack novelty in the light of document 2 cited in the international search report. The "forming of nitrogen radicals and oxygen radicals using a high-frequency plasma" described in claim 1 is disclosed in document 2 (paragraph [0064]).

Claim 15

The invention described in claim 15 does not involve an inventive step in the light of document 1 and document 3 cited in the international search report. The techniques disclosed in document 1 and document 3 all pertain to methods for forming a MOS transistor gate-insulating film. Therefore, a person skilled in the art could easily conceive of changing the method for forming an oxynitride film disclosed in document 3 to the method for forming an oxynitride film disclosed in document 1.

Claims 4 and 11

The inventions described in claims 4 and 11 involve an inventive step relative to the documents cited in the international search report. Document 1 does not disclose "a procedure wherein the ratio of the aforementioned oxygen gas or oxygen compound gas to the aforementioned nitrogen gas or nitrogen compound gas contained in the aforementioned mixed gas is made to vary over time."

Claims 5 and 6, claims 12 and 13

The inventions described in claims 5 and 6 and claims 12 and 13 involve an inventive step relative to the documents cited in the international search report. Document 1 does not disclose a feature wherein "the aforementioned nitrogen radicals and oxygen radicals are fed onto a substrate to be processed by placing said radicals in a gas current formed so as to flow along the surface of the aforementioned substrate."

Claims 7, 14, and 20

The inventions described in claims 7, 14, and 20 involve an inventive step relative to the documents cited in the international search report. Documents 1 and 2 do not disclose a feature wherein "a nitrogen gas and an

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oxygen gas are excited using a frequency of 400 kHz to 500 kHz."